

## Hydrothermal regime of a young oceanic crust segment (Mid-Atlantic Ridge) constrained by heat flow measurements

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The LUCKYFLUX experiment, conducted in 2003, has provided more than 150 new heat-flow measurements in the vicinity of the Lucky Strike segment (Mid Atlantic ridge south of the Azores Island between ~35°N and 39°N). An important topographic structure (a volcanic plateau associated with a V-shaped ridge) separates the near-axis domain from the off-axis domain to the East and acts as a major component of the hydrodynamic system. The off-axis domain presents a large number of heat flow values that are in agreement with conductive models (40 % of heat-flow values within ±20% of predicted values) but some values present a more complex 3D pattern of positive and negative anomalies. The effects of fluid circulations are the more likely cause for these heat-flow anomalies. Some of them are located near basement exposures, but basement structures do not create anomalies systematically. Smaller size characterizes positive anomalies, and two major negative anomalies with opposite characters can be defined. The first one is located at the eastern flank of the plateau, which requires fluids moving from west to east. The second one is located near a basement exposure at the east of the zone, which requires fluid moving from east to west. First order modelling requires fluid velocities comparable to that proposed for Juan de Fuca (order of 1-10 m/year for 500 m of highly permeable basement). This suggests that the permeability structure is comparable in slow and fast spreading ridges environments. We will present the first results of a complete 3D modelling of the complex heat flow pattern observed in this context of a slow spreading ridge.